

A. REMARKS

Claims 1-8 and 10-20 remain in this application. Claim 9 was previously cancelled.

1. OFFICIAL NOTICE

The final Office Action has rejected the need to provide documentary evidence of the various takings of official notice as unseasonable. While it is acknowledged that the Office has a procedural need to be aware of a challenge to the taking of official notice in a timely fashion, the challenge to the taking of official notice was made in response to the first office action received after filing a request for continuing examination. The rationale stated in the MPEP, and quoted in the Office Action, is that the examiner must be given the opportunity to provide the evidence or explain why no evidence is required. It would appear that the examiner has had this opportunity. The examiner certainly could have supplied these references and made this action final according to the MPEP. Accordingly, the challenge to the taking of Official Action is restated herein, and, for the purpose of a complete record, Applicants do not assent to the determination that the facts which are supported only by Official Notice are admitted prior art.

2. REJECTIONS UNDER 35 U.S.C. 103

Claims 1-2, 4-8, 11-16 and 18-20 were rejected under 35 U.S.C. 103 as unpatentable over Massiglia in view of Khosrowpour. This rejection is respectfully traversed.

The Office Action rejects the argument made in the Response filed January 9, 2003 that Massiglia teaches away from combining striping and mirroring into a single controller. However, in a recent case the Federal Circuit indicated that if references taken in combination would produce a seemingly inoperative device, such references teach away from the combination. McGinley v. Franklin Sports Inc., 262 F.3d 1339, 60 USPQ2d 1001 (Fed. Cir. 2001). In the instant case, the proposed combination of Massiglia and the '844 teachings would be inoperable. Massiglia teaches a single controller that performs multiple types of RAID protection on a single array of physical disks. The '844 reference teaches the use of redundant RAID controllers to

maintain data transfers in the event of a fault.

The combination of Massiglia and the '844 reference presumably involves using the '844 dual RAID controllers to implement each of the layers in Massiglia. However, each of the management layers in Massiglia performs different RAID functions and mappings. In contrast, the '844 controllers are essentially and necessarily identical in function and performance. Hence, if one were to combine the references, the functionality claimed by the claimed front-end controller and back-end controllers would not be suggested. Alternatively, if the '844 controllers were combined consistent with Massiglia, the combination would fail to provide the redundant, failover function of the '844 reference. Accordingly, the references teach against combination because the combination would be inoperable. For at least this reason, the rejection of claims 1-2, 4-8, 11-16 and 18-20 should be withdrawn.

Independent claim 1 calls for, among other things, back-end controllers coupled to a plurality of disks for organizing and presenting the first plurality of disks as a third plurality of redundant arrays and a front-end controller coupled to the second plurality of back-end controllers for generating mirror sets from at least one of the redundant arrays. Claim 1 further calls for striping at least one of the disks in the third plurality of redundant arrays of disks and presenting the striped arrays as a virtual volume. The claimed combination of back-end controllers and a front-end controller are not shown or suggested by the relied on references.

The '844 controllers are redundant with respect to each other, which means that each controller performs the same functions, and each controller has the same connections to the physical storage disks. If the two controllers were connected differently or were to provide different functions, the essential purpose of the '844 patent would be destroyed. Each of the '844 controllers is coupled to the physical disks...not to a virtual disk. In other words, there is no suggestion to alter the '844 design so that one of the controllers was coupled to the other so as to provide a RAID mapping of the drives presented by the first controller. Again, such a combination violates the very essence of the '844 patent. For at least these reasons, claim 1 is not shown or suggested by the relied on references.

Claims 2 and 4-5 that depend from claim 1 are believed to be allowable for at least the same reason as claim 1. Moreover, claim 2 calls for the plurality of disks to include spare disks. Massiglia does not show "spare" disks. The Office Action states that a mirror arrangement inherently consists of a one active disk and one spare disk. However, in a mirrored arrangement, both of the mirrors are considered active. A "spare" as called for in claim 2 is a disk that is available to be substituted in place of a failed one of the mirrors, not one of the mirrors itself. Similarly, claims 4 and 5 include specific limitations that are not shown or suggested in the relied on references either alone or in combination.

Independent claim 6 calls for, among other things, a RAID engine comprising a plurality of back-end controllers coupled to a plurality of disks that present the plurality of disks as a plurality of RAID sets. Claim 6 also calls for a striping engine coupled to the RAID engine for generating mirror sets from at least one of the plurality of RAID sets, striping at least one of the disks in the member RAID sets, and presenting the striped member RAID sets as a virtual volume. Claim 6, therefore, distinguishes over the relied on combination of references for at least the reasons set out in regard to claim 1. Specifically the combination of Massiglia and the '884 reference does not show the combination of front-end and back-end controllers each coupled to each other and to physical storage devices so as to perform the specific RAID functions and mappings called for in claim 6. Claim 7 is allowable for at least the same reasons as claim 6.

Claim 8 calls for, among other things, back-end controllers, each configured to organize and present X N-member RAID sets, and each having N busses capable of supporting X+1 disks each. Claim 8 further calls for a second plurality of groups of X+1 disks, wherein each disk in the group is coupled to one of the N busses associated with one of the plurality of back-end controller busses, and a front-end controller coupled to the plurality of back-end controllers for receiving the X N-member RAID sets as members, striping the X N-member RAID sets, and presenting the striped X N-member RAID sets as a virtual volume. These features of the apparatus called for in claim 8 are not shown or suggested in the relied on references.

Massiglia does not show front-end and back-end controllers. Massiglia does

not show multiple controllers that are interconnected so that the virtual disks presented by one controller become members of a RAID set managed by another controller. The '844 reference does not teach the interconnection and functionality called for in claim 8 either. Moreover, as noted above, the combination of the Massiglia and '884 references does not result in the claimed two-controller apparatus. For at least these reasons and the reasons stated above in reference to claim 1, claim 8 and 11-12 that depend from claim 8 are believed to be allowable.

Claims 13-14 and 18 each call for, in varying language, the combination of elements including back-end controllers that are coupled to front-end controllers where the back-end and front-end controllers provide distinct RAID functionality. As set out above, the combined reference fail to show or suggest either the interconnection called for in these claims or the functionality achieved.

3. CONCLUSION

In view of all of the above claims 1-8 and 10-20 are believed to be allowable and the case in condition for allowance which action is respectfully requested.

No fee is believed to be required by this response as determined on the accompanying transmittal letter. Should any other fee be required, please charge Deposit 50-1123. Should any extension of time be required please consider this a petition therefore and charge the required fee to Deposit Account 50-1123.

Respectfully submitted,

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